REMARKS

Claims 1 and 23 have been amended. New claims 43 and 44 have been added. Thus, Claims 1, 2, 5, 6, 9, 18-27, 29 and 38-44 are presented for examination. Support for the amendment to claims 1 and 23 may be found at page 5, lines 5-9. Support for new claims 43 and 44 may be found in original claim 1, and at page 9, lines 11-30.and in Figs. 2-4 Thus, no new matter has been added. Reconsideration and withdrawal of the present rejections in view of the comments presented herein are respectfully requested.

Rejection under 35 U.S.C. §103(a)

Claims 1, 2, 5, 6, 9, 18-27, 29 and 28-42 were rejected as allegedly being unpatentable over Sarshar et al. (WO 95/074414) in view of Wiltshire et al. (GB 2 239 676) in view of Cholet et al. (US 4,718,824) in view of Talley (US 3,590,902).

The present invention relates to a system and process for pumping multiphase fluids, and in particular for boosting the production of gas and oil from low pressure wells. The need for a production boosting system is described in detail in the introductory portion of the present specification.

Sarshar discloses a system for pumping multiphase fluids using two cyclonic phase separators, a gas-gas jet pump and a liquid-liquid jet pump (see Fig. 3). However, this system does not disclose the following features recited in present claim 1:

a) a compressor that is constructed and arranged to receive gas from a sustainable gas source and compress the gas to a pressure in the range 50-150 bar;

b) a knockout vessel for removing retained liquid from the separated low pressure gas phase, having an inlet connected to receive the low pressure gas phase from the (cyclone-type) phase separator, and

c) a liquid pump that comprises a positive displacement pump.

Furthermore, in Sarshar, the low pressure inlet of the gas-gas jet pump is not connected to receive low pressure gas from a knockout vessel, and the high pressure inlet of the gas-gas jet

pump is not connected to receive high pressure gas from a compressor. In addition, the liquid pump (31) does not receive a low pressure liquid phase from a knockout vessel.

In Sarshar, the gas-gas jet pump (32) receives high pressure gas from a high pressure gas well, which acts as the motive fluid for the jet pump. The disadvantage of this arrangement is that the high pressure gas supply may be unreliable and of inconsistent pressure and composition. Further, the low pressure gas is taken directly from the cyclonic separator (42) to the low pressure inlet of the gas-gas jet pump (32), which can reduce the efficiency of the pump since the gas phase may include some entrained liquid. Furthermore, instead of a positive displacement pump for the liquid phase, Sarshar uses a liquid-liquid jet pump, which requires the availability of a suitable high pressure liquid supply to serve as the motive fluid for the jet pump since a suitable sustainable source of high pressure liquid might not be available.

Regarding feature (a) above, the Examiner notes that Wiltshire discloses a compressor (16' in Figure 2). However, in that arrangement, the compressor is used to supply gas as a motive fluid to a gas-liquid jet pump (which is very inefficient), not to supply high pressure gas as a motive fluid to a gas-gas jet pump.

Further, in Wiltshire, the compressor does not take gas from a sustainable gas source. Instead, it takes gas from a gas separator 11, which draws a gas-liquid mixture from an inlet 10. The quantity of gas reaching the compressor therefore depends on the flow rate and composition of the fluids entering the input. If these are the production fluids of a well, both the flow rate and the composition are likely to vary significantly over time. For example, if the fluids experience "slugging" (that is, they consist of alternating "slugs" of liquids and gases), the gas quantity reaching the compressor is likely to vary from 0% to 100% of the produced fluids. Furthermore, the produced fluids may diminish or vary in quantity or composition over the long term as the output of the well changes. This will have a severe impact on the operation of the jet pump and could render it inoperative for significant periods of time. The gas supply disclosed in Wiltshire is therefore not a sustainable gas source as recited in the present claims.

Regarding feature (b) above, the Examiner states that Talley discloses a knockout vessel. However, the knockout vessel disclosed in Talley is not used in a system for pumping fluids, as recited in the present claims. The system disclosed in Talley is not a pumping system, and includes no pumps except a glycol supply pump 58. In fact, in Talley, the pressure of the flowing fluids is decreased by passing the gas through a choke 48 (col. 3, lines 63-67). In addition, although Talley discloses a knockout vessel 38, this is not connected to the gas outlet of a cyclone-type separator and its gas outlet is not connected to the low pressure inlet of a gas-gas jet pump.

Furthermore, neither Sarshar or Talley teach or suggest the addition of a knockout vessel to the pumping system of Sarshar. Talley is concerned with a different process (the separation of gas from liquids in a subsea production system), in which the knockout vessel is the primary separator. Thus, there is nothing in Talley to suggest the use of a knockout vessel as a secondary separator where the primary separator is a cyclone separator, as recited in claim 1. Sarshar does not suggest any need for a secondary separator following separation of gas and liquids by a cyclone separator. Neither of these documents, either alone or in combination, suggests the advantages resulting from this arrangement – in particular the enhanced performance of the gas-gas jet pump. Therefore, a person of ordinary skill in the art would have no reason to modify the pumping system of Sarshar to include the knockout vessel of Talley.

Regarding feature (c), the Examiner points out that a positive displacement pump is known from Cholet. However, the system disclosed in Cholet is entirely unrelated to the system recited in the present claims. Cholet only discloses that fluids can be pumped with a mechanical pump. There is nothing in Cholet to suggest any advantages resulting from the use of a positive displacement pump in a system as presently claimed, for example avoiding the need for a sustainable source of high pressure liquid. Furthermore, there is nothing in Sarshar to suggest the use of a mechanical pump. In fact, Sarshar teaches away from the use of a mechanical pump by emphasizing the advantages of jet pumps (see page 1 lines 21-28 and page 4, lines 11-27). A person of ordinary skill in the art would therefore see no reason for adapting the system of Sarshar to include the mechanical pump of Cholet.

Therefore, one of ordinary skill in the art would not combine the teachings of Sarshar, Wiltshire, Cholet and Talley. Claims 2, 5, 6, 9 and 18-22 are dependent on claim 1, and claims 24-27, 29 and 38-42 are dependent on claim 23. Since claim 23 is nonobvious, then these claims are necessarily nonobvious, at least for the reasons noted above.

With regard to claims 43 and 44, these claims include all the features of claims 1 and 23, respectively. Thus, these claims are also allowable at least for the reasons set out above. In addition nothing in any of the cited documents teaches or suggests a commingler that is connected to receive and combine LP liquid phases from a cyclone-type phase separator and a knock-out vessel, and a liquid pump having a LP inlet that is connected to receive the combined LP liquid phases from the commingler.

Thus, the presently claimed invention provides numerous unexpected advantages over the system disclosed by Sarshar which are neither disclosed nor suggested by Sarshar et al or by any of the secondary references, alone or in combination. In addition, these unexpected advantages could not have been predicted by one having ordinary skill in the art. The presence of these significant, unexpected advantages would effectively rebut any allegation of *prima facie* obviousness if one were present, and strongly support the nonobviousness of the presently claimed invention.

In view of the comments presented above, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a).

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure,

including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

CONCLUSION

Should there be any questions concerning this application, the Examiner is invited to contact the undersigned agent at the telephone number appearing below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: 8/28/09

By: _____

Neil S. Bartfeld, Ph.D.
Registration No. 39,901
Agent of Record
Customer No. 20,995
(619) 235-8550

7701945
082409